

## 5.1

1. magma
2. igneous rock
3. lava
4. extrusive
5. intrusive
6. true
7. false
8. true
9. false
10. false
11. true
12. as the pressure on a rock increases, its melting point increases
13. no; different minerals have different melting points
14. temperature increases with depth in Earth's crust
15. pressure increases with depth from the weight of overlying rock
16. melting points
17. partial melting
18. elements
19. reverse
20. fractional crystallization
21. magma
22. discontinuous reaction series
23. continuous reaction series
24. calcium
25. sodium
26. when magma cools rapidly, the calcium-rich cores are unable to react completely with the magma, resulting in a zoned crystal with sodium rich outer layers and calcium rich cores
27. at the end of magma crystallization, the remaining melt, which is enriched with silica and oxygen, finally crystallizes, forming quartz
28. ultramafic
29. intermediate
30. felsic
31. mafic
32. ultramafic
33. mafic
34. intermediate
35. mafic
36. felsic
37. ultramafic
38. obsidian has very small grain size
39. obsidian is extrusive; its glassy texture without obvious grains probably formed as lava cooled quickly on earth's surface
40. gabbro has large crystals in contrast to obsidian's crystals, which are very small

41.gabbro is intrusive; its large grains probably formed as magma cooled slowly below Earth's surface.

5.2

1. c

2. d

3. b

4. e

5. f

6. a

7. to observe the shapes of mineral grains

8. as the grains crystallize from magma, they grow together and form irregular edges

9. they have space in which to grow freely

10. porphyritic rocks are characterized by large, well0formed crystals surrounded by finer-grained crystals

11.porphyritic textures can form if a slowly cooling magma suddenly begins cooling rapidly

12.d

13.a

14.c

15.b

16.a

17.c

18.a

19.d

20.b